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PIONEER MUNICIPAL HIGH INCOME TRUST
Form N-Q
September 29, 2010

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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM N-Q

QUARTERLY SCHEDULE OF PORTFOLIO HOLDINGS
OF REGISTERED MANAGEMENT INVESTMENT COMPANY

Investment Company Act file number 811-21321

Pioneer Municipal High Income Trust
(Exact name of registrant as specified in charter)

60 State Street, Boston, MA 02109
(Address of principal executive offices) (ZIP code)

Terrence J. Cullen, Pioneer Investment Management, Inc.,
60 State Street, Boston, MA 02109
(Name and address of agent for service)

Registrant's telephone number, including area code: (617) 742-7825

Date of fiscal year end: April 30

Date of reporting period: July 31, 2010

Form N-Q is to be used by management investment companies, other than small business investment companies registered on Form N-5 (239.24 and 274.5 of this chapter), to file reports with the Commission, not later than 60 days after close of the first and third fiscal quarters, pursuant to Rule 30b1-5 under the Investment Company Act of 1940 (17 CFR 270.30b1-5). The Commission may use the information provided on Form N-Q in its regulatory, disclosure review, inspection, and policymaking roles.

A registrant is required to disclose the information specified by Form N-Q, and the Commission will make this information public. A registrant is not required to respond to the collection of information contained in Form N-Q unless the Form displays a currently valid Office of Management and Budget ("OMB") control number. Please direct comments concerning the accuracy of the information collection burden estimate and any suggestions for reducing the burden to Secretary, Securities and Exchange Commission, 450 Fifth Street, NW, Washington, DC 20549-0609. The OMB has reviewed this collection of information under the clearance requirements of 44 U.S.C. ss. 3507.

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ITEM 1. Schedule of Investments.

Pioneer Municipal High Income Trust SCHEDULE OF INVESTMENTS 7/31/10 (unaudited)		Value
Principal Amount		
	TAX EXEMPT OBLIGATIONS - 126.9% of Net Assets	
	Alabama - 1.4%	
1,000,000	Huntsville-Redstone Village Special Care Facilities Financing Auth., 5.5%, 1/1/28	830,960
4,500,000	Huntsville-Redstone Village Special Care Facilities Financing Auth., 5.5%, 1/1/43	3,453,840
		4,284,800
	Arizona - 2.1%	
5,000,000	Apache County Ind. Dev. Auth., 5.85%, 3/1/28	5,000,400
960,000	Pima County Ind. Dev. Auth., 7.25%, 7/1/31	964,762
500,000	Yavapai County Ind. Dev. Auth., 6.0%, 8/1/33	504,220
		6,469,382
	California - 8.1%	
7,885,000	(a) California State University Rev., RIB, 10.627%, 11/1/39 (144A)	8,225,790
602,382	(b) California Statewide Communities Dev. Auth. Environmental Facilities Rev., 9.0%, 12/1/38	58,732
1,000,000	California Statewide Communities Dev. Auth. Rev., 7.25%, 10/1/38	1,016,150
5,150,000	+ Golden State Tobacco Securitization Corp., 7.8%, 6/1/42	6,147,709
7,000,000	+ Golden State Tobacco Securitization Corp., 7.875%, 6/1/42	8,370,180
1,000,000	University of California Rev., 5.0%, 5/15/25	1,063,540
655,000	(b) Valley Health System Hosp. Rev., 6.5%, 5/15/25	484,831
		25,366,932
	Connecticut - 5.1%	
10,335,000	(a) Connecticut Health & Edl. Facilities Auth. Rev., RIB, 11.149%, 7/1/42 (144A)	11,853,935
5,000,000	Mohegan Tribe Indians Gaming Auth., 6.25%, 1/1/31	4,111,150
		15,965,085
	District of Columbia - 3.4%	
5,000,000	District of Columbia Tobacco Settlement Financing Corp., 6.5%, 5/15/33	4,793,350
6,000,000	District of Columbia Tobacco Settlement Financing Corp., 6.75%, 5/15/40	5,930,880
		10,724,230
	Florida - 4.8%	
1,700,000	Beacon Lakes Community Dev., 6.9%, 5/1/35	1,681,861
1,000,000	Hillsborough County Ind. Dev. Auth. Rev., 8.0%, 8/15/32	1,143,830
2,390,000	Liberty County Subordinate Rev., 8.25%, 7/1/28	2,307,641
2,500,000	Miami-Dade County Aviation Rev., 5.5%, 10/1/41	2,563,125
1,000,000	St. Johns County Ind. Dev. Auth. Rev., 5.25%, 1/1/	835,650
2,000,000	St. Johns County Ind. Dev. Auth. Rev., 5.375%, 1/1	1,539,980
5,000,000	Tallahassee Health Facilities Rev., 6.375%, 12/1/3	5,008,650
		15,080,737
	Georgia - 2.6%	
4,240,000	(a) Atlanta Georgia Water & Waste Rev., RIB, 10.628%, 11/1/43 (144A)	4,321,790
500,000	Clayton County Dev. Auth. Rev., 9.0%, 6/1/35	523,945
2,400,000	Fulton County Residential Care Facilities Rev., 5.0%, 7/1/27	1,728,000

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1,100,000	Fulton County Residential Care Facilities Rev., 5.125%, 7/1/42	689,150
1,000,000	Rockdale County Dev. Auth. Rev., 6.125%, 1/1/34	939,850
	Idaho - 1.6%	8,202,735
5,000,000	Power County Ind. Dev. Corp., 6.45%, 8/1/32	5,030,000
	Illinois - 13.5%	
2,000,000	(c) Centerpoint Intermodal Center, 7.5%, 6/15/23 (144A	2,025,440
12,000,000	Chicago O'Hare Intl. Airport Special Facility Rev., Ref. Bonds, 5.5%, 12/1/30	8,898,720
1,000,000	Illinois Fin. Auth. Rev., 6.0%, 11/15/27	779,460
3,865,000	Illinois Fin. Auth. Rev., 6.0%, 8/15/38	3,898,394
2,000,000	Illinois Fin. Auth. Rev., 6.0%, 8/15/39	2,188,140
4,000,000	Illinois Fin. Auth. Rev., 6.0%, 11/15/39	2,790,840
2,500,000	Illinois Fin. Auth. Rev., 6.5%, 4/1/39	2,622,475
4,000,000	Illinois Fin. Auth. Rev., 8.25%, 5/15/45	3,963,000
1,500,000	(b) Illinois Health Facilities Auth. Rev., 6.9%, 11/15	571,800
16,880,000	(d) Metropolitan Pier & Exposition Auth. Dedicated State Tax Rev., 0.0%, 6/15/22	13,036,086
1,685,000	Southwestern Illinois Dev. Auth. Rev., 5.625%, 11/	1,231,516
		42,005,871
	Indiana - 3.7%	
5,000,000	Indiana Health & Edl. Facility Financing Auth. Hosp. Rev., 5.0%, 2/15/39	4,724,300
4,300,000	Indiana State Dev. Fin. Auth. Rev., 5.75%, 10/1/11	4,379,034
2,570,000	Vigo County Hosp. Auth. Rev., 5.8%, 9/1/47 (144A)	2,352,193
		11,455,527
	Louisiana - 2.0%	
1,500,000	Louisiana Local Government Environmental Facilities Rev., 6.75%, 11/1/32	1,551,390
5,000,000	Louisiana Public Facilities Auth. Rev., 5.5%, 5/15	4,681,300
		6,232,690
	Massachusetts - 6.3%	
5,000,000	Massachusetts Dev. Fin. Agency Rev., 5.75%, 1/1/42	5,573,700
2,360,000	Massachusetts Dev. Fin. Agency Rev., 7.1%, 7/1/32	2,161,359
1,000,000	Massachusetts Edl. Financing Auth. Rev., 6.0%, 1/1	1,063,530
3,500,000	Massachusetts Health & Edl. Facilities Auth. Rev., 6.25%, 7/1/22	3,551,835
2,500,000	Massachusetts Health & Edl. Facilities Auth. Rev., 6.5%, 1/15/38	2,264,175
5,000,000	Massachusetts Health & Edl. Facilities Auth. Rev., 6.75%, 10/1/33	4,990,650
		19,605,249
	Michigan - 3.4%	
935,000	Doctor Charles Drew Academy, 5.7%, 11/1/36	580,747
1,340,000	Flint Michigan Hosp. Building Auth. Rev., 5.25%, 7	1,318,238
1,500,000	John Tolfree Health System Corp., 6.0%, 9/15/23	1,275,015
2,000,000	Michigan State Hosp. Fin. Auth. Rev., 5.5%, 8/15/2	1,919,960
5,830,000	Michigan Tobacco Settlement Fin. Auth., 6.0%, 6/1/	4,207,686
1,450,000	Star Intl. Academy Certs. of Participation, 6.125%	1,390,347
7,720,000	(e) Wayne Charter Escrow, 0.0%, 12/1/15	0
		10,691,993
	Minnesota - 0.9%	
1,675,000	Duluth Econ. Dev. Auth. Health Care Facilities Rev., 7.25%, 6/15/32	1,713,659
1,000,000	Minneapolis & Saint Paul Housing & ReDev. Auth. Rev., 5.25%, 8/15/35	1,016,370
		2,730,029
	Mississippi - 1.0%	
3,000,000	Mississippi Business Fin. Corp. Pollution Control Rev., 5.9%, 5/1/22	2,996,400

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		Montana - 0.1%	
1,600,000	(b)	Two Rivers Auth., Inc. Correctional Facility Improvement Rev., 7.375%, 11/1/27	224,096
		Nebraska - 0.2%	
2,000,000		Grand Island Solid Waste Disposal Facilities Rev.,	603,080
		Nevada - 0.0%	
2,000,000	(b)	Nevada State Dept. of Business & Industry, 7.25%,	10,000
		New Jersey - 11.9%	
2,000,000		New Jersey Econ. Dev. Auth. Rev., 6.25%, 9/15/19	1,963,240
13,350,000		New Jersey Econ. Dev. Auth. Rev., 6.25%, 9/15/29	12,713,205
6,150,000	(c)	New Jersey Econ. Dev. Auth. Rev., 7.0%, 11/15/30	6,160,701
10,370,000		New Jersey Transportation Trust Fund Auth., 0.0%,	4,374,377
10,000,000	+	Tobacco Settlement Financing Corp., 6.75%, 6/1/39	11,725,800
			36,937,323
		New Mexico - 1.2%	
1,500,000		Otero County New Mexico Project Rev., 6.0%, 4/1/23	1,274,220
2,960,000		Otero County New Mexico Project Rev., 6.0%, 4/1/28	2,399,169
			3,673,389
		New York - 8.4%	
2,500,000		Albany New York Ind. Dev. Agency Civic Facilities Rev., 5.25%, 11/15/27	2,477,375
3,000,000		Dutchess County Ind. Dev. Agency Rev., 7.5%, 3/1/2	2,992,560
2,000,000		Hempstead Local Dev. Corp. Rev. Bonds, 5.75%, 7/1/	2,103,840
2,250,000		Nassau County New York Ind. Dev. Agency Rev., 6.7%	2,238,030
990,000		New York City Ind. Dev. Agency, 6.9%, 8/1/24	880,595
2,000,000		New York City Ind. Dev. Agency, 7.625%, 12/1/32	2,021,880
1,000,000		New York State Dormitory Auth. Rev., 6.125%, 12/1/	1,008,010
7,040,000	(a)	New York State Dormitory Auth. Rev., RIB, 12.596%,	9,414,522
3,000,000		Suffolk County Ind. Dev. Agency, 7.25%, 1/1/30	3,001,680
			26,138,492
		North Carolina - 3.2%	
4,935,000		Charlotte Special Facilities Rev., 5.6%, 7/1/27	4,241,830
5,740,000		Charlotte Special Facilities Rev., 7.75%, 2/1/28	5,757,048
			9,998,878
		Oklahoma - 1.8%	
1,225,000		Tulsa Municipal Airport Rev., 6.25%, 6/1/20	1,144,236
4,350,000		Tulsa Municipal Airport Rev., 7.35%, 12/1/11	4,350,043
			5,494,279
		Pennsylvania - 7.6%	
3,000,000		Allegheny County Hosp. Dev. Auth. Rev., 5.0%, 11/1	2,360,010
1,550,000		Allegheny County Hosp. Dev. Auth. Rev., 5.125%, 5/	1,423,009
12,300,000	+	Allegheny County Hosp. Dev. Auth. Rev., 9.25%, 11/	12,865,062
1,000,000		Columbia County Hosp. Auth. Health Care Rev., 5.9%	861,360
755,000		Hazleton Health Services Auth. Hosp. Rev., 5.625%,	738,284
1,280,000		Langhorne Manor Borough Higher Ed. & Health Auth. Rev., 7.35%, 7/1/22	657,459
5,000,000		Pennsylvania Econ. Dev. Financing Auth. Solid Waste Disposal Rev., 6.0%, 6/1/31	4,396,000
500,000		Pennsylvania Higher Edl. Facilities Auth. Rev., 5.	500,935
			23,802,119
		Rhode Island - 1.7%	
6,000,000		Central Falls Detention Facilities Rev., 7.25%, 7/	5,167,500
		South Carolina - 1.4%	
3,185,000	+	South Carolina Jobs Econ. Dev. Auth. Rev., 6.375%, 8/1/34	3,692,848
665,000	+	South Carolina Jobs Econ. Dev. Auth. Rev., 6.375%, 8/1/34	775,343

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			4,468,191
		Tennessee - 4.8%	
7,000,000	+	Johnson City Health & Edl. Facilities Board Hosp. Rev., 7.5%, 7/1/33	7,924,840
2,480,000		Knox County Health, Edl. & Housing Facilities Board Hosp. Rev., 6.375%, 4/15/22	2,665,702
4,600,000		Sullivan County Health, Edl. & Housing, Facilities Board Hosp. Rev. , 5.25%, 9/1/36	4,273,354
			14,863,896
		Texas - 14.5%	
1,345,000		Bexar County Housing Fin. Corp., 8.0%, 12/1/36	1,016,000
1,000,000		Dallas-Fort Worth Intl. Airport Rev., 6.0%, 11/1/1	937,980
4,000,000		Decatur Hosp. Auth. Rev., 7.0%, 9/1/25	4,019,320
769,709	(b)	Gulf Coast Ind. Dev. Auth. Rev., 7.0%, 12/1/36	75,047
3,750,000		Houston Airport System Special Facilities Rev., 5.7%, 7/15/29	3,261,862
5,340,000		Lubbock Health Facilities Dev. Corp., 6.625%, 7/1/	4,983,074
10,000,000		North Texas Tollway Auth. Rev., 5.75%, 1/1/33	10,548,400
2,810,000	(a)	Northside Independent School District, RIB, 10.983	3,118,960
2,000,000		Tarrant County Cultural Ed. Facilities Fin. Corp.,	1,983,760
1,000,000		Tarrant County Cultural Ed. Facilities Fin. Corp.,	1,031,870
1,500,000		Tarrant County Cultural Ed. Facilities Fin. Corp.,	1,556,280
7,040,000	(a)	Texas State, RIB, 11.832%, 4/1/30 (144A)	8,126,483
5,130,000		Willacy County Local Government Corp. Rev., 6.875%	4,557,697
			45,216,733
		Utah - 0.2%	
800,000		Spanish Fork City Charter School Rev., 5.55%, 11/1	687,520
		Vermont - 0.5%	
1,500,000		Vermont Edl. & Health Buildings Financing Agency Rev., 6.0%, 10/1/28	1,558,035
		Virginia - 0.3%	
1,000,000		Peninsula Ports Auth., 6.0%, 4/1/33	1,028,010
		Washington - 9.1%	
4,710,000		Spokane Public Facilities District Hotel/Motel Tax & Sales, 5.75%, 12/1/27	4,922,798
7,025,000		Tobacco Settlement Auth. Rev., 6.625%, 6/1/32	6,964,163
14,315,000		Washington State General Obligation, 0.0%, 6/1/22	9,096,180
3,795,000		Washington State Health Care Facilities Auth. Rev.	3,932,569
5,000,000		Washington State Housing Fin. Committee Nonprofit Rev., 5.625%, 1/1/27	3,559,700
			28,475,410
		Wisconsin - 0.1%	
2,320,000	(b) (f)	Aztalan Wisconsin Exempt Facilities Rev., 7.5%, 5/	301,600
		TOTAL TAX-EXEMPT OBLIGATIONS (Cost \$383,443,093)	395,490,211
		MUNICIPAL COLLATERALIZED DEBT OBLIGATION - 2.4% of Net Assets	
10,000,000	(c) (f)	Non-Profit Preferred Funding Trust I, 12.0%, 9/15/3	7,457,000
		TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION (Cost \$10,000,000)	7,457,000
		Shares COMMON STOCK - 0.9% of Net Assets	
249,158	(g)	Delta Air Lines, Inc.	2,959,997
		TOTAL COMMON STOCK (Cost \$6,612,756)	2,959,997

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	TAX-EXEMPT MONEY MARKET	
	MUTUAL FUND - 0.8% of Net Assets	
2,500,000	BlackRock Liquidity Funds MuniFund Portfolio	2,500,000
	TOTAL TAX-EXEMPT MONEY	
	MARKET MUTUAL FUND	
	(Cost \$2,500,000)	2,500,000

	TOTAL INVESTMENTS IN SECURITIES - 131.0%	
	(Cost \$402,555,849) (h) (i)	408,407,208
	OTHER ASSETS AND LIABILITIES 1.4%	4,285,240
	PREFERRED SHARES AT REDEMPTION VALUE,	
	INCLUDING DIVIDENDS PAYABLE - (32.4)%	-101,004,135
	NET ASSETS APPLICABLE TO	
	COMMON SHAREOWNERS - 100.0%	311,688,313

RIB Residual Interest Bonds

NR Security not rated by S&P or Moody's.

(144A Security is exempt from registration under Rule 144A of the Securities Act of 1933.

Such securities may be resold normally to qualified institutional buyers in a transaction exempt from registration. At July 31, 2010 the fair value of these securities amounted to \$57,583,633, or 18.5% of net assets applicable to common shareowners.

+ Prerefunded bonds have been collateralized by U.S. Treasury or U.S. Government Agency securities which are held in escrow to pay interest and principal on the tax exempt issue and to retire the bonds in full at the earliest refunding date.

(a) The interest rate is subject to change periodically and inversely based upon prevailing market rates. The interest rate shown is the coupon rate at July 31, 2010.

(b) Security is in default and is non-income producing.

(c) The interest rate is subject to change periodically. The interest rate shown is the coupon rate at July 31, 2010.

(d) Debt obligation initially issued at one coupon which converts to a higher coupon rate at a specific date. The rate shown is the coupon rate at July 31, 2010.

(e) Security is valued using fair value methods (other than prices supplied by independent pricing services) .

(f) Indicates a security that has been deemed illiquid. The aggregate cost of illiquid securities is \$12,320,000. The aggregate fair value is \$7,758,600, or 2.5% of the total net assets applicable to common shareowners.

(g) Non-income producing.

(h) The concentration of investments by type of obligation/market sector is as follows:

Insured:

NATL-RE	7%
AMBAC	2
MBIA	1
FSA	1

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	PSF	1
	ACA	0
Rev. Bonds:		
	Health Rev.	32
	Airport Rev.	14
	Tobacco Rev.	12
	Other Rev.	12
	Ed. Rev.	4
	Dev. Rev.	4
	Facilities Rev.	4
	Pollution Control Rev.	4
	Transportation Rev.	3
	Gaming Rev.	1
	Housing Rev.	0
	Utilities Rev.*	0
Total		100%
* Amount is less than 0.1%		

(i) At July 31, 2010, the net unrealized gain on investments based on cost for federal income tax purposes of \$400,500,819 was as follows:

Aggregate gross unrealized gain for all investment	
there is an excess of value over tax cost	34,821,521
Aggregate gross unrealized loss for all investments in which	
there is an excess of tax cost over value	(26,915,132)
Net unrealized gain	7,906,389

For financial reporting purposes net unrealized gain on investments was \$5,581,359 and cost of investments aggregated \$402,555,849.

Purchases and sales of securities (excluding temporary cash investments \$8,920,250 and \$7,749,255, respectively.

Various inputs are used in determining the value of the Fund's investments. These inputs are summarized in the three broad levels listed below.

Highest priority is given to Level 1 inputs and lowest priority is given to Level 3.

Level 1 - quoted prices in active markets for identical securities

Level 2 - other significant observable inputs (including quoted prices for similar securities, interest rates, prepayment speeds, credit risk, etc.)

Level 3 - significant unobservable inputs (including the Fund's own assumptions in determining fair value of investments)

The following is a summary of the inputs used as of June 30, 2010, in valuing the Fund's assets:

	Level 1	Level 2	Level 3	Total
Tax Exempt Obligations	\$0	\$395,490,211	\$ 0	\$395,490,211
Municipal collateralized				
Debt Obligation		7,457,000	0	7,457,000
Common Stocks	2,959,997	0	0	2,959,997
Tax-exempt Money Market				
Mutual Fund	2,500,000	0	0	2,500,000
Total	\$5,459,997	\$402,947,211	0	\$408,407,208

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ITEM 2. CONTROLS AND PROCEDURES.

(a) Disclose the conclusions of the registrant's principal executive and principal financial officers, or persons performing similar functions, regarding the effectiveness of the registrant's disclosure controls and procedures (as defined in Rule 30a-3(c) under the Act (17 CFR 270.30a-3(c))) as of a date within 90 days of the filing date of the report that includes the disclosure required by this paragraph, based on the evaluation of these controls and procedures required by Rule 30a-3(b) under the Act (17 CFR 270.30a-3(b)) and Rule 13a-15(b) or 15d-15(b) under the Exchange Act (17 CFR 240.13a-15(b) or 240.15d-15(b)).

The registrant's principal executive officer and principal financial officer have concluded that the registrant's disclosure controls and procedures are effective based on their evaluation of these controls and procedures as of a date within 90 days of the filing date of this report.

(b) Disclose any change in the registrant's internal controls over financial reporting (as defined in Rule 30a-3(d) under the Act (17 CFR 270.30a-3(d))) that occurred during the registrant's last fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.

There were no significant changes in the registrant's internal control over financial reporting that occurred during the second fiscal quarter of the period covered by this report that have materially affected, or are reasonably likely to materially affect, the registrant's internal control over financial reporting.

ITEM 3. EXHIBITS.

(a) A separate certification for each principal executive officer and principal financial officer of the registrant as required by Rule 30a-2(a) under the Act (17 CFR 270.30a-2(a)).

Filed herewith.

SIGNATURES

[See General Instruction F]

Pursuant to the requirements of the Securities Exchange Act of 1934 and the Investment Company Act of 1940, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

(Registrant) Pioneer Municipal High Income Trust

By (Signature and Title)* /s/ John F. Cogan, Jr.
John F. Cogan, Jr, President

Date September 29, 2010

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Pursuant to the requirements of the Securities Exchange Act of 1934 and the Investment Company Act of 1940, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

By (Signature and Title)* /s/ John F. Cogan, Jr.
John F. Cogan, Jr., President

Date September 29, 2010

By (Signature and Title)* /s/ Mark Bradley
Mark Bradley, Treasurer

Date September 29, 2010

* Print the name and title of each signing officer under his or her signature.